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# CURRENT LITERATURE

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## BOOK REVIEWS

### Soil conditions and plant growth

The rapid progress that is being made in the scientific field encompassed by plant physiology and soil science is evidenced in the appearance of a third and enlarged edition of RUSSELL'S *Soil conditions and plant growth* in the series of Monographs on Biochemistry edited by PLIMMER and HOPKINS. The first edition (1912) contained 166 pages, including 13 pages of citations; the second edition (1915) contained 188 pages, including 14 pages of citations; and the third edition (1917) contains 240 pages, including 18 pages of citations. The growth of the subject is marked by the addition of a chapter on "The relationship between the micro-organic population of the soil and the growth of plants" to the second edition, and a chapter on "The colloidal properties of soil" to the third edition. In his preface to this new edition the author states that he has not attempted to refer to every paper published on the subject since the first edition, but that his "guiding principle has been to include only those that brought in some new idea or profoundly modified an old one." The choice of papers is naturally a question of judgment, yet the reviewer feels that certain important omissions have been made, and he will therefore direct the reader's attention to these in the hope that they may serve to supplement this admirable treatment of practical plant physiology. Certain papers published since 1917, and therefore not referable to as "omissions," will be included in order to bring the subject up to date.

Chapter II on "The requirements of plants" presents a modern physiological basis for the rest of the book. This chapter has been enlarged to the extent of 5 pages over the first edition. In the discussion of limiting factors the treatment of oxygen (only 9 lines) and temperature seems quite inadequate. Attention is therefore directed to the following papers:

*On temperature relations of plants.*—LEITCH, I., Some experiments on the influence of temperature on the rate of growth of *Pisum sativum*. Ann. Botany 30:25-46. 1916; LEHENBAUER, P. A., Growth of maize seedlings in relation to temperature. Physiol. Researches 1:247-288. 1914; LEPESCHKIN, W. W., Zur Erkenntnis der Einwirkung supramaximaler Temperaturen auf die Pflanze. Ber. Deutsch. Bot. Gesell. 30:703-714. 1912; MAXIMOW (MAKSIMOV), N. A., Chemische Schutzmittel der Pflanzen gegen Erfrieren. Ber. Deutsch. Bot.

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<sup>1</sup> RUSSELL, E. J., Soil conditions and plant growth. 3d ed. pp. 243. figs. 14. New York: Longmans, Green and Co. 1917.

Gesell. 30:52-65, 293-305, 504-816. 1912; GROVES, J. F., Temperature and life duration of seeds. BOT. GAZ. 63:169-189. 1917.

*On oxygen relations of plants.*—SHULL, CHARLES A., The oxygen minimum and the germination of *Xanthium* seeds. BOT. GAZ. 52:453-477. 1911; CANNON, W. A., and FREE E. E., The ecological significance of soil aëration. Science N.S. 45:178-180. 1917; LIVINGSTON, B. E., and FREE, E. E., The effects of deficient soil oxygen on the roots of higher plants. Article in "Contributions to Plant Physiology." Johns Hopkins University. Reprint from Johns Hopkins University Circular. March 1917.

The new edition deserves high praise for its comprehensive treatment and impartial judgment on the modern developments in soil chemistry. The discussion on the use of dilute acids in soil analysis, based on the author's own work in the Rothamsted laboratories, is the first contribution on this subject that has forsaken empirical experimental methods and adopted a modern physico-chemical procedure. The review of the highly controversial literature on soil acidity is eminently fair. The attention of the reader is called to the following recent papers, each of which contains an extensive bibliography: CHRISTENSEN, H. R., Experiments in methods for determining the reaction of soils. Soil Science 4:115-178. 1917; TRUOG, E., Soil acidity. I. Its relation to the growth of plants. Soil Science 5:169-195. 1918; RICE, F. E., and OSUGI, S., The inversion of cane sugar by soils and allied substances and the nature of soil acidity. Soil Science 5:333-358. 1918.

The biological aspects of soil science are fully treated, including the author's own interesting ideas on soil protozoa and partial sterilization. The reviewer feels that RUSSELL has been somewhat partial to his own views in not referring to SHERMAN's studies. SHERMAN concludes, on the basis of his experiments, that "no evidence has been obtained which indicates that the beneficial effect of partial sterilization is due to the elimination of a biological factor which is harmful to the bacteria." BOLLEY's interesting views on "Soil sanitation" deserve mention in a chapter that bears such an all-inclusive title as "The relationship between the micro-organic population of the soil and the growth of plants." The following papers should be read in connection with the chapter: SHERMAN, J. M., Studies on soil protozoa and their relation to the bacterial flora. Jour. Bacteriology 1:35-66, 165-185. 1916; KOPELOFF, N., and COLEMAN, D. A., A review of investigations in soil protozoa and soil sterilization. Soil Science 3:197-269. 1917; BOLLEY, H. L., Wheat-soil troubles, causes of soil sickness, etc. Bull. 107. N.D. Agric. Exper. Sta. 1913; BOLLEY, H. L., Conservation of the purity of soils in cereal cropping. Science N.S. 32:529-541. 1910; BOLLEY, H. L., Cereal cropping: sanitation, a new basis for crop rotation, manuring, tillage, and seed selection. Science N.S. 38:249-259. 1913; HOPKINS, C. G., The bread supply. Science N.S. 38:479-481. 1913.

KEEN's mathematical studies on the retention of water by soil are amply discussed, but no mention is made of SHULL's even more important contribution to the problem of the wilting coefficient. The reader is therefore referred to the

following: SHULL, C. A., Measurement of the surface forces in soils. BOT. GAZ. 62:1-31. 1916.

The final chapter is devoted to a theoretical discussion of soil analysis. An appendix describes analytical methods used in England. The reviewer believes that the reader should be cognizant of the following discussions of American methods: BEAR, F. E., and SALTER, R. M., Methods in soil analysis (Technical Bulletin). Bull. 159. West Virginia Agric. Exper. Sta. Morgantown. 1916; AMES, J. W., and SCHOLLENBERGER, C. J., Liming and lime requirement of soil. Bull. 306. Ohio Agric. Exper. Sta. Wooster. 1916; TRUOG, E., A new test for soil acidity. Bull. 249. Wisconsin Agric. Exper. Sta. Madison. 1915; BOUYOUCOS, GEO. J., and MCCOOL, M. M., The freezing point method as a new means of measuring the concentration of the soil solution directly in the soil. Tech. Bull. 24. Michigan Agric. Exper. Sta. East Lansing. 1915.—H. L. WALSTER.

### MINOR NOTICES

**History of phytopathology.**—WHETZEL,<sup>2</sup> in his *History of phytopathology*, aims "only to set forth in outline what appear to be the most outstanding features in the evolution of the science, and to indicate the proper relation thereto of the men who have chiefly shaped its progress." The chief captions are: (1) The Ancient Era, to the end of the 5th century (5 pp.); (2) The Dark Era, 6th to 16th centuries (1 p.); (3) The Premodern Era, 1600 to about 1850 (19 pp.); (4) The Modern Era, 1853 to about 1906 (65 pp.); (5) The Present Era, 1906 (8 pp.). As is indicated by the page allotment, the first and second topics are treated very briefly, being barely sketched. The third and fifth topics are treated somewhat more fully, while the most page space is given to "The Modern Era." The book is in the main a series of brief biographical sketches, often with portraits, arranged chronologically under the captions indicated. It will be a convenient reference book for those who may need ready access to such biographies.—F. L. STEVENS.

**Winter botany.**—To supplement his pocket manual of woody plants, already noted in this journal,<sup>3</sup> TRELEASE<sup>4</sup> has compiled and published a companion volume for use in naming our common trees and shrubs when without foliage. The range, extending to 326 genera and over 1000 species, includes most introduced as well as native woody plants. The notable features of the volume, aside from its convenient pocket size and abundant illustrations from most accurate drawings, are the numerous keys and the many citations of literature dealing with winter characters of the various genera and species. The

<sup>2</sup> WHETZEL, H. H., An outline of the history of phytopathology. pp. 130. Saunders Co. 1918.

<sup>3</sup> BOT. GAZ. 65:194. 1918.

<sup>4</sup> TRELEASE, WILLIAM, Winter botany. 16mo. pp. 394. figs. 327. Urbana, Ill. Published by the author. 1918. \$2.50.